Terminology: Ontology

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- Being, Existence
- Entity, Cause
- Individual, Universal
- Essence, Accident
- Identity, Persistence
- Potentiality, Actuality
- Abstract , Concrete
- Discrete, Continuous
- Substance, Form, Matter
- Occurrence
- Phenomenon
- State, Event, Process
- Disposition, Capability
- Modality
- Quantity, Quality
- Space, Time, Force
- Function, Permutation
- Condition, Constraint

Being, Existence

Being	Existence
• The nature or essence of what something is.	• The fact that something is real.
• A fictional character, Real Object	• Real Objects

Existence is a subset of Being

Entity, Four Causes (Aristotle)

Entity	Four Causes
• Anything that exists or can be referred to. • Object • Person • Idea • Event • Number.	1. **Material:** What it is made of. 2. **Formal**: What makes it what it is. 3. **Efficient**: What produces it. 4. **Final**: Why it exist.
• Capacitor • A capacitor exists because matter, form, making, and purpose come together.	1. **Material**: aluminium / copper, ceramic, polymer, mica, air 2. **Formal**: Two conductive plates, Separated by a dielectric, Arranged to store electric charge 3. **Efficient**: coating, layering, winding, sintering, sealing 4. **Final**: To store electrical energy, To filter, stabilize, and delay signals, To control voltage in circuits

Individual, Universal

Individual	Universal
• A single, specific instance. • this one	• A general kind shared by many individuals. • the type
• This capacitor • Anna University	• Capacitor • University

Individuals *instantiate* universals.

Essence, Accident

Essence	Accident
• What a thing must be to be what it is. • necessary nature • Removing essence destroys the thing.	• What a thing can change without losing its identity. • changeable property. • Removing accident only alters it.
Human: Rationality → Essence **Triangle**: Three sides → Essence	**Human**: Height, skin colour, weight → Accident **Triangle**: Size, colour → Accident

Identity, Persistence

Identity	Persistence
• What makes something the same thing and not another.	• How something continues to exist through time.
• what it is.	• how long / through change.
• **A person**: Name, nature → Identity • **A ship**: “Same ship” question → Identity	• **A person**: Growing from child to adult → Persistence • **A ship**: Surviving repairs and time → Persistence

Potentiality , Actuality

Potentiality	Actuality
• The capacity to become or occur. • can be • Tree • Building	• Reality as fulfilled or realized. • is • Seed • Plan

Actuality is *fulfilled* potential.

Abstract, Concrete

Abstract	Concrete
• Exists in thought, not physically. • cannot be touched • Number	• Exists physically and materially. • can be touched / measured • Apple

Discrete, Continuous

Discrete	Continuous
• Made of separate, Countable, distinct units. • People in a room.	• Divisible only by partition, not by counting. • Water in a river.

Substance – Form – Matter

- Substance = the thing itself
- Form = what makes it this kind of thing
- Matter = what it is made of
- Statue:
  - Substance → The statue itself
  - Form → Shape/design
  - Matter → Marble

Matter gives stuff,
Form gives structure,
Substance gives being.

Occurrence

- An instance of happening.
- Something that takes place at a time.
  - A lightning strike, A phone call, An accident, A sound occurring
- An occurrence is a single happening, not a process.

Phenomenon

- Something as it appears or is experienced.
- A phenomenon is reality as observed, not necessarily as it is in itself.
  - Rainbow, Mirage, Sound heard, Light seen.
- Phenomenon = appearance to experience.

State – Event – Process

State	Event	Process
• The condition of something at a time.	• A change that happens.	• A series of changes over time.
• how it is	• what happens	• happens continuously

Water: Ice → State, Melting → Event, Evaporation cycle → Process

Events *change* states; processes *link* events.

Disposition – Capability

Disposition	Capability
• A natural tendency to act in a certain way. • tendency	• The power to perform an action. • ability
• Kindness	• Ability to speak

Disposition inclines; capability enables.

Modality

- The manner in which something exists or is true.

The three main modes

- Possibility → may be — It may rain → Possible
- Actuality → is — It is raining → Actual
- Necessity → must be — 2 + 2 = 4 → Necessary

Modality tells how something is, not what it is.

Quantity – Quality

- Quantity: How much or how many.
  - Magnitude: Quantity as continuous measure.
    Length, weight, volume, time, temperature
  - Multitude: Quantity as countable units.
    Number of students, coins, books, atoms
- Quality: What kind or what nature.

- 5 kg → Quantity
- Heavy → Quality
- 10 students → Quantity
- Intelligent → Quality

Quantity measures; Quality describes.

Space – Time – Force

- Space: Where things exist and occur.
- Time: When things exist and change.
- Force: That which causes change in motion or state.

  - Room → Space
  - Noon → Time
  - Push → Force

All physical reality unfolds in Space, through Time, under Force.

Function – Permutation

Function	Permutation
• A rule that assigns each input exactly one output. • mapping	• A rearrangement of the same elements. • reordering
• $f(x) = x^2$	• (A, B, C) → (C, A, B)

A function *changes* value; a permutation *changes* position.

Condition – Constraint

Condition	Constraint
• A requirement for something to occur or exist. • enables	• A limitation on what can occur or exist. • limits
• Oxygen → Condition for fire	• Fuel limit → Constraint on fire

Conditions allow; constraints restrict.